ABSTRACT

AIM:

To estimate the amount of Bisphenol A (BPA) present in saliva and blood before and after composite placement - In Vivo Study

OBJECTIVES:

1. To estimate the level of BPA present in human Saliva in individuals before the composite resin placement, immediately after the restoration placement and on the 7^{th} day after the restoration placement.
2. To estimate the level of BPA present in human Saliva in individuals with orthodontic bracket bonded with light cure composite before the procedure, immediately after the procedure and on the 7^{th} day after the procedure.
3. To estimate the level of BPA present in human Saliva with individuals restored with pre-fabricated metallic post luted with resin based luting agent before the procedure, immediately after the procedure and on the 7^{th} day after the procedure.
4. To estimate the level of BPA present in human blood in individuals prior to composite restoration on the 7^{th} day after the procedure.

5. To estimate the level of BPA present in human blood in individuals with orthodontic brackets bonded with light cure composite before the procedure and on the 7th day after the procedure.
6. To estimate the level of BPA present in human blood in individuals with prefabricated metallic post luted with resin based luting agent before the procedure and on the 7th day after the procedure.

METHODOLOGY:

Totally 40 patients, were included in this in vivo study. They were subdivided into 4 groups with 10 patients assigned to each group. Oral and written informed consent is obtained from all the study participants. For all the participants in each group, salivary samples are collected thrice and blood samples are collected twice. Right before the procedure was performed; 2ml of unstimulated saliva is collected for 5 min in a BPA free plastic vial. Following the procedure, the mouth is thoroughly rinsed and after waiting for 5 min, 2nd sample of 2ml saliva is collected in a separate BPA free plastic vial Seven days after the procedure, the 3rd collection of 2ml unstimulated saliva, is collected for 5 min in a BPA free plastic vial. Collected salivary samples are cryopreserved in the laboratory in a programmable refrigerator at -20 C. For all the participants in each group, 2ml of blood samples were collected into a 5 ml glass BD vacutainer using a disposable 21 gauge stainless steel syringe and needle. The blood is collected, allowed to clot and spun down after 30 mins. Then the serum is separated off by centrifuging. The centrifuged serum samples are transferred to 4-ml glass vials and stored in a freezer at - 20° C.

BPA analysis in saliva and serum is carried out with Human Bisphenol (BPA) Elisa Kit through conducting replicate measurements to quantify BPA levels and for high accurate determination

RESULTS:

BPA was found in all the samples taken

The mean value of sample in pretreatment salivary samples is 2.01

The mean value of sample in pretreatment blood samples is 0.758

Among the salivary sample, Groups restored with composite resin (class I and II) showed the highest mean value of BPA level (4.17) followed by orthodontic brackets bonded with light cure composites (Group C – 3.95) and post and core luted with resin based luting agents (Group D – 3.67). The mean value of BPA in salivary samples on the 7^{th} day of group B, C, and D are (2.03), (2.04) and (2.02) respectively.

Serum BPA level after 7 days in patients with composite restoration was found to be higher with a mean level of 1.43 when compared to the serum BPA level in patients with orthodontic brackets bonded with light cure composites (Group C -1.24) and post and core luted with resin based luting agents (Group D – 1.00).

CONCLUSION:

The present study concludes that the BPA was present in all the samples. Among the groups, Group B which is class 1 and class 2 cavities restored with composite resin had the maximum amount of BPA present in salivary samples (4.17), followed by Group C which is the orthodontic bracket bonded with light cure composite resin (Transbond XT) (3.95) and Group D which is prefabricated metallic post luted with resin based composite (3.67) immediately after the procedure. This is the 1st study undertaken to estimate the leaching of BPA from a composite luting agent. The mechanism behind the leaching of BPA from composite luting agent is beyond the scope of this study.

With respect to blood samples collected, before the procedure and 7 days after the procedure, Group B which is class 1 and class 2 cavities restored with composite resin had the maximum amount of BPA present in blood samples (1.43), followed by Group C which is the orthodontic bracket bonded with light cure composite resin (Transbond XT) (1.24) and Group D which is prefabricated metallic post luted with resin based composite (1.00) 7 days after the procedure.

BPA can also be seen leaching out from the resin based luting agent.

Keywords: Composite, Saliva, blood, centrifuge, Bisphenol A, ELISA